

U.S. Patent Appln. No.: 10/723,782
Response/Amdt. dated: 08/24/06
Office Action dated: 06/01/06

REMARKS

Claim Objections

Claims 3, 4, 11, and 12 are amended to address the Examiner's objections to informalities therein.

Further, the status identifiers for all claims have been placed in the proper positions.

Claim Rejections Under 35 USC Section 102

Claims 1, 2, 6, 7, 9, and 10 were rejected under 35 U.S.C. 102(b) as being anticipated by the Patouraux U.S. Patent 6,804,986, and Claims 1-7, 9-13, 23-25, and 28-30 were rejected under 35 U.S.C. 102(e) as being anticipated by the Horton U.S. Patent 6,853,947. The rejections on prior art are deemed to be addressed by the Amendment of Claims submitted herein.

In the invention, a spacecraft gyro is calibrated along an orbit path by determining a yaw attitude residual from a first yaw attitude measurement taken by a sun sensor used to determine absolute yaw attitude when the sun is in the field of view of the sensor, and subtracting a second yaw attitude measurement estimated by gyro compassing when the sun is not in the field of view of the sensor, then converting the difference yaw attitude residual to a roll bias residual, and using the converted roll bias residual in the calibration of the gyro. This prevents the buildup of error from determining the yaw attitude residual by gyro compassing alone, and also reduces error in the roll bias residual that occurs due to thermal deformation and other factors.

In the Final Office Action, the Examiner stated that the phrase "first yaw attitude measured by attitude sensors" encompasses the prior art use of roll and pitch attitude sensors to calculate yaw attitude, thereby rendering the claims unpatentable. Main Claims 1 and 13 are amended herein to clarify that the sun sensor is used to determine absolute yaw attitude in determining the yaw attitude

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residual.

Related main Claim 23 directed to measuring spacecraft attitude during a yaw transient period, and gain scheduling gyro calibration and attitude determination using spacecraft attitude measured during a yaw transient period, is also amended to clarify that the sun sensor is used to determine absolute yaw attitude in determining a yaw attitude residual.

As noted by the Examiner, Pastouraux does not provide a sensor for measuring the yaw angle, and therefore cannot carry out the gyro calibration step as recited in the claims. Horton teaches sensing the attitude of an accelerating object by measuring acceleration with accelerometers in 3-axis measurements, and measuring angular rate with angular rate sensors to compute attitude, and a corrective rate signal is determined from acceleration as a reference for a Kalman filter. However, Horton does not teach or suggest taking a first yaw attitude measurement by a sun sensor to determine absolute yaw attitude when the sun is in the field of view of the sensor, and subtracting a second yaw attitude measurement estimated by gyro compassing when the sun is not in the field of view of the sensor, then converting the difference yaw attitude residual to a roll bias residual, and using the converted roll bias residual in the calibration of the gyro.

The claim amendments are fully supported in the Specification as filed, particularly at Page 7, Paragraph 0023-0024 and 0037. No new matter is deemed to have been added. Clarification of the invention subject matter to correct indefiniteness is submitted for purposes of advancing prosecution, and is not deemed to be a surrender of any previously recited or equivalent invention subject matter.

In summary, Claims 1-7, 9-13, 23-25, and 28-30 maintained in the application are deemed to be in condition for allowance, and issuance of a Notice of Allowance upon reconsideration is requested.